

# Emergency Action Plan (EAP)

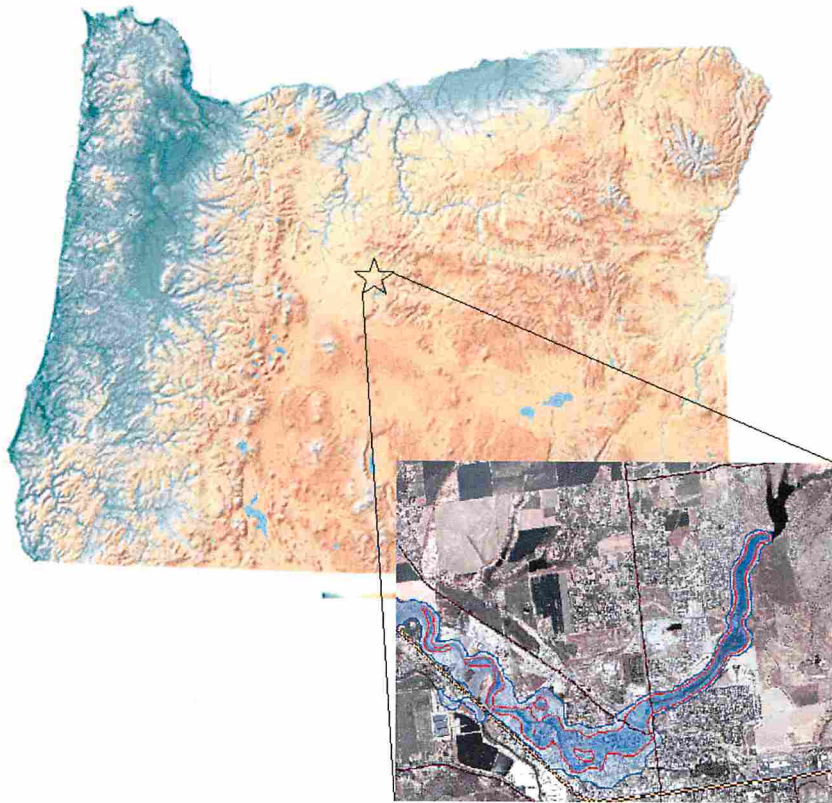
## Barnes Butte Reservoir

National Inventory of Dams NID-OR00284

Crook County, Oregon

For Hudspeth Family LTD Partnership

**FINAL**



With Support from  
The Oregon Water Resources Department Dam Safety Program

## **Urgent – dam failure -flooding is imminent or in progress**

### **Call 9-1-1**

Message: I am reporting an emergency at Barnes Butte Reservoir in Crook County, Oregon. This is **name and position** with the **organization**. This is an urgent emergency, the dam is failing and a dam breach flood will occur. People are in danger and need to evacuate. Please implement the emergency action plan. I am at **location** and can be reached at **phone number** after you have made emergency notifications. Refer to Page 15 in the EAP for additional detail on notifications.

*Stay on the phone with the 9-1-1 operator until you both agree necessary information has been exchanged and the emergency response effectively initiated.*

## **Potential dam failure situation is rapidly developing**

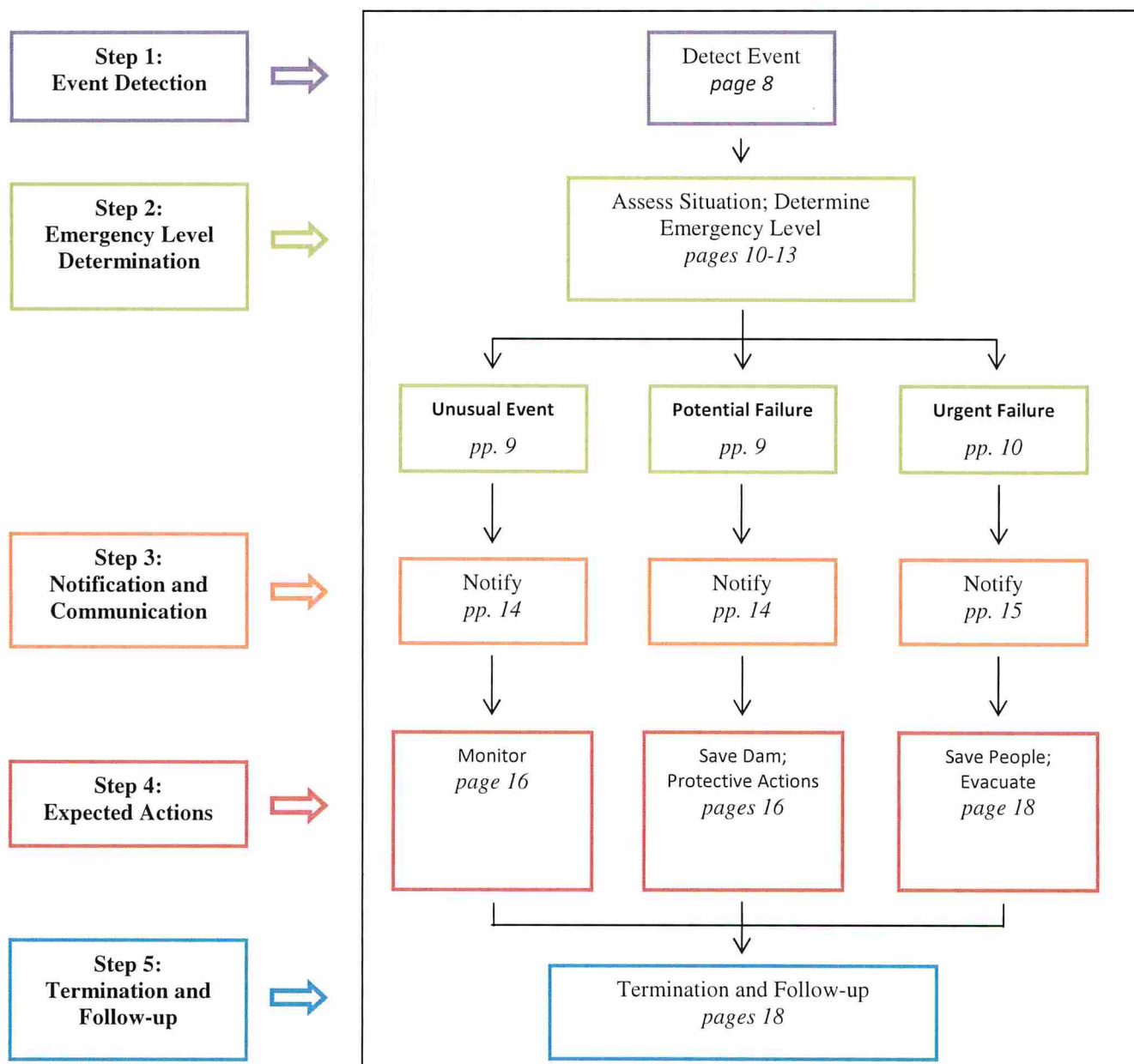
1. Call dam owner, information on page 8.
2. Dam owner to confirm Emergency condition
3. Dam owner or representative - Call 9-1-1

Message: I am reporting an emergency at Barnes Butte Reservoir in Crook County, Oregon. This is **name and position** with the **organization**. At this time it is a potential dam failure emergency. Please inform the Incident Commander, Crook County Emergency Management, and make other emergency contacts as necessary to prepare for possible evacuations. I am at **location** and can be reached at **phone number**. We are taking emergency actions to save the dam, and will contact the State dam safety engineer and our engineer for technical advice on preventing dam failure. Refer to Page 15 in the EAP for additional detail on notifications.

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## 2.0 EAP Overview





## 3.0 Basic EAP Data

### 3.1 Purpose and Intent

This EAP contains pre-planned actions to reduce the risk of human life loss and injury and minimize property damage during an emergency event at Barnes Butte Reservoir. It allows people with limited dam familiarity to act decisively during an unusual or emergency situation.

### 3.2 Dam Description and History

There are a number of ongoing issues with Barnes Butte Dam, one of which was identified in the Phase I Investigation done by the Army Corp of Engineers. The report stated the inadequate spillway capacity as an urgent matter; this is heightened in lieu of a smaller basin size than accurate used for the hydrologic analysis.

Barnes Butte Reservoir is classified as a high hazard dam due to the potential for loss of life and property damage to homes in North Prineville along the Ochoco Creek and Ryegrass Ditch.

Height: 28 feet	Drainage Area: 4.4 sq. miles
Built: 1955	Hazard Classification: High
Legal Description: Section 28, Town. 14S. and Range 16E.	Dam Operator: Hudspeth Family LTD Partnership
Latitude: 44.3267 Longitude: -120.826118	Major Property Owner: Hudspeth Family LTD Partnership
National Inventory of Dams Number: OR00284	Storage: 420 ac-ft

### 2.3 Directions to dam

From US HWY 26, Turn North on Main St Proceed approx. 2.1 miles, turn right onto Barnes Butte Rd., proceed approx. 1.2 miles, Barnes Butte Reservoir will be on your right. There are several alternative routes to Barnes Butte Reservoir.

### 2.4 Potential Impacted Area

See Inundation Maps in Section 9.0 on page 24 for the locations that may be flooded if the dam should fail. The maps also show the estimated time for the flood wave to travel from the dam to affected locations: The impacted area is in Crook County. The following road segments are affected:

<b>NE Main Street</b>	<b>between</b>	<b>NE Mariposa Avenue and NE 7<sup>th</sup> Street</b>
<b>NE 13 Street</b>	<b>from</b>	<b>NE Main Street to east end</b>
<b>NW Lamonta Road</b>	<b>between</b>	<b>NW Ewen Street and NE Main Street</b>
<b>NW 10<sup>th</sup> Street</b>	<b>between</b>	<b>NW Main Street and west end</b>
<b>NE Belknap Street</b>	<b>from</b>	<b>E 8<sup>th</sup> Street to north end</b>
<b>E 8<sup>th</sup> Street</b>	<b>between</b>	<b>NE Belknap Street to NE Main Street</b>
<b>NW Beaver Street</b>	<b>between</b>	<b>NW 10<sup>th</sup> Street and NW 7<sup>th</sup> Street</b>

NW 9 <sup>th</sup> Street	between	NE Main Street and NW Madras Highway
NW Claypool Street	between	NW 10 <sup>th</sup> Street and NW 5 <sup>th</sup> Street
NW 8 <sup>th</sup> Street	between	NE Main Street and NW Locust Ave
NW Deer Street	between	NW Lamonta Road and NW 5 <sup>th</sup> Street
NW 7 <sup>th</sup> Street	between	NW Beaver Street and NW Fairmont Street
NW Ewen Street	from	NW Lamonta Road to south end
NW 5 <sup>th</sup> Street	between	NW Locust Street and NW Deer Street
NW 6 <sup>th</sup> Street	between	NW Madras highway and east end
NW Pinkston Court	off	NW 6 <sup>th</sup> Street
NW Locust Ave	between	NW 6 <sup>th</sup> Street and NW 5 <sup>th</sup> Street
NW Hardwood Ave	between	NW 4 <sup>th</sup> Street and NW 12 <sup>th</sup> Street
NW Cains Road	off	NW Locust Avenue
NW Dodson Drive	off	NW Madras Highway
NW Markuson Drive	off	NW Madras Highway
NW 12 <sup>th</sup> Street	between	NW Locust Avenue and NW 12 <sup>th</sup> Street
NW Seehale Avenue	from	NW 12 <sup>th</sup> to end
Studebaker Drive	off	NW Madras Highway
NW Cacade Loop	off	NW Madras Highway
NW Breann Loop	off	NW Western Sky Road
Bucko Drive	off	NW Western Sky Road
Big Guy Lane	off	NW Western Sky Road
Mallard Lane	off	NW Western Sky Road
NW Teal Loop	off	NW Western Sky Road
NW Drake Lane	between	NW Teal Loop
NW Western Sky Rd	off	NW Gardener Road
NW Gardener Rd	off	NW Madras Highway
NW Gumpert Rd	off	NW Madras Highway

## 4.0 Roles and Responsibilities

### Dam Owner

Hudspeth Family LTD Partnership	PO Box 478 Prineville, OR 97751	(970) 259-3080
NAME*:	ADDRESS*:	PHONE*:

- As soon as an emergency event is observed or reported, immediately determine the emergency classification as described in page 8.
- As soon as an emergency event is detected, immediately determine the emergency level (see step 2 – Emergency Level Determination, page 10)
  - Non-emergency incident; Unusual event; Slowly developing situation
  - Potential dam failure situation; Rapidly developing
  - Urgent; Dam failure is imminent or in progress
- Monitor dam for changing conditions, and take all actions to save the dam if potential failure situation exists.
- Provide updates of conditions that could cause dam failure to Michael Ryan or 9-1-1 dispatcher to assist them in making timely and accurate decisions regarding warnings and evacuations.
- Provide leadership to assure the EAP is reviewed and updated as needed and copies of the revised EAP are distributed to all who received copies of the original EAP.

### Incident Commander

Crook County Sheriff's Office Mike Ryan, Emergency Manager	308 NE 2 <sup>nd</sup> Street Prineville, OR 97754	Phone (541) 447-6398 Cell: (541) 921-7448
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- Serve as the primary contact person responsible for coordination of all emergency actions. Select an alternate emergency manager for situations where the planned Incident Commander is not available.
- Due to the number of homes within the inundation area and complexity of organizing evacuations, and evacuation map is recommended for development by the incident commander.
- When a potential failure situation occurs:
  - Prepare emergency management personnel for possible evacuations that may be needed if a Level 3 situation occurs.
  - Alert public as appropriate
- When an Urgent failure occurs:
  - Initiate warnings and order evacuation of people at risk downstream of the dam.
  - Carry out the evacuation of people and close roads within the evacuation area (see Section 9: Inundation Maps).
  - Alert the general public of the emergency.

\*In the case of a new dam owner, fill in appropriate information

- Notify local emergency management services to carry out the evacuation of people and close roads within the evacuation area (see Inundation Map, Section 5).
- Decide when to terminate the emergency actions.
- Participate in review and updates of the EAP.

#### **Oregon Dam Safety Engineer and Technical Consultant**

Keith Mills Oregon Dam Safety Engineer	725 Summer St. NE Suite A Salem, OR 97301	Phone (503) 986-0840
Ochoco Irrigation District Mike Kasberger, General Manager	1001 N. Deer St. Prineville, OR 97754	Phone (541) 447-6449

- Assist dam owner in determination of emergency classification.
- Notify the Oregon Emergency Response System (OERS) of potential dam failure emergency, and consult with OERS on scope of emergency for potential, imminent and dam failure emergencies.
- Advise the dam owner on appropriate actions that can save the dam (potential failure).
- Provide technical information to the dam owner and incident commander (imminent failure).
- Conduct a forensic investigation of the dam failure.

#### **Oregon Emergency Response System (OERS)**

- Complete notifications by emergency classification as shown on Page 17.
- Open the Emergency Operations Center if needed.
- Advise the Governor on State Emergency Declarations and State resources needed.
- Direct internal and other agency staff during a State Emergency.



## 5.0 Five Step EAP Process

### Step 1 Event Detection

This step describes the detection of an unusual or emergency event. Information is provided herein to assist the dam owner in determining the appropriate emergency level for the event.

#### 5.11 Unusual or emergency events may be detected by:

- Observations at or near the dam by dam owner or other observers.
- Unusual events, especially flash floods or earthquakes

#### 5.12 Pre-existing conditions on this dam

There is a spring located beneath the reservoir of this dam, which is mostly responsible for filling the reservoir. Ochoco Irrigation District's main Canal which has a carrying capacity of approximately 150 cfs of irrigation water runs parallel across the drainage basin approximately 1.5 miles above the tail end of the reservoir. The canal diverts upwards of 75% of the water from the small 4.4 square mile basin.

Failure of the Irrigation Districts canal would warrant a potential emergency. Emergencies may also exist if there is cracking or slope movement, or structural damage.

#### 5.13 Probable Failure Modes

Due to freeboard less than 18 inches and the size of the spillway; overtopping leading to erosion at the toe and eventually complete failure is the most probable failure mechanism.

The failure modes are classified in order of likelihood of occurrence as follows:

- A. Flood overtopping or dam overfilling
- B. Embankment or reservoir movement
- C. Leakage and internal erosion

##### A. Flooding or overfilling

Water flowing over the top of dams causes the most serious failures of earthen dams. High flows can also cause severe erosion and head cutting of the spillway, which if uncontrolled will lead to a dam breach.

##### B. Embankment or reservoir movement

It is very important to actively inspect the dam for signs of movement after intense earthquake shaking or a long duration flood event.

### **C. Leakage and internal erosion**

A small volume of clear seepage is common on most earthen dams and occurs on this dam. An increase in seepage or a new area of seepage can sometimes be an indicator of a more serious problem. If there is muddy seepage this often indicates internal erosion of the dam, and is very serious. Sinkholes in the dam or whirlpools in the reservoir next to the dam can also indicate dam safety problems.

## **Step 2 Emergency Classification Determination**

After an unusual or emergency event is detected and verified, the Dam Owner is responsible for classifying the event into one of the following three emergency types of emergencies from the most severe to ones that require attention that are not life threatening:

### **5.21 Non-Emergency Incident; Unusual event; slowly developing situation**

A non-emergency is an unusual condition that warrants inspection and monitoring for changes. A potential dam failure exists when conditions affecting dam safety are rapidly changing and emergency actions, including repair, are essential. It is also essential that emergency managers are notified so that they can prepare if the situation worsens and evacuations are needed. However, the dam is not at imminent risk of failure (hours). For unusual conditions and potential failure conditions, the dam owner should consult with the State Dam Safety Engineer and their engineer as needed to make determination the appropriate emergency classification, if any.

#### **Indicators of an unusual event:**

##### **A.1 Flooding or Overfilling**

- A Flash Flood warning has been issued by NWS for this specific location.
- The primary spillway is obstructed.
- The reservoir water level is within 18" of the top of the dam.

##### **B.1 Embankment or Reservoir Rim Movement**

- A small, shallow and isolated landslide occurs on the downstream face of the dam.

##### **C.1 Leakage and Internal Erosion**

- A never before observed seep location in the downstream face or abutment of the dam is identified.
- Deposits of material likely eroded from the dam are observed at seepage locations or below internal drain pipes, with clear drainage water.

### **5.22 Potential dam failure situation, rapidly developing**

This situation may eventually lead to dam failure and flash flooding downstream, but there is not an immediate threat of dam failure. The Local Emergency Manager should be notified of this emergency situation and placed on alert. The dam owner should closely monitor the condition of the dam and periodically report the status of the situation to the Local Emergency Manager and State Dam Safety Engineer. As time permits, remedial actions should be taken to delay, moderate, or prevent failure of

the dam. If the dam condition worsens and failure becomes imminent, the Local Emergency Manager must be notified immediately of the change in the emergency level to evacuate the people at risk downstream.

The State Dam Safety Engineer should be contacted to evaluate the situation and recommend remedial actions to prevent failure of the dam. The dam owner should initiate remedial repairs (note local resources that may be available – See Appendix A Available Local Resources). Time available to employ remedial actions may be only hours so rapid deployment is a must.

This emergency level is also applicable when flow through the spillway has, or is expected to, result in flooding of downstream areas where people near the channel could be endangered. Emergency services should be on alert to initiate evacuations or road closures if the flooding increases.

#### Indicators of a Potential Failure:

##### A.2 Flooding or Overtopping

- The reservoir level is less than 1 foot below dam crest and rising.
- The reservoir level is near the crest of the dam, but is not rising, and there is no embankment erosion observed.
- Head cutting of spillway has moved to within 50 feet of the reservoir.

##### B.2 Embankment or Reservoir Rim Movement

- A deep landslide moves part of the embankment but does not extend into upstream slope of dam.

##### C.2 Leakage and Internal Erosion

- Rapidly increasing seepage is observed and measured (doubling in a week or less).
- There is a small and clear leak through the dam (over 20 gpm).
- There is muddy seepage coming directly out of the dam.
- A small whirlpool is observed in the reservoir near the dam and this whirlpool is not associated with spillway flow.
- The reservoir level is falling without apparent cause.

#### **5.23 Urgent; dam failure is imminent or in progress**

For an imminent failure condition the priority is to notify 9-1-1 in order to save lives. Actions at the dam under an imminent failure condition should be to protect persons on site, delay the flood if possible, and inform emergency managers on status of flooding at the dam. Guidance to determine emergency classification is organized the same way as emergency detection in step 1. The following criteria are guidelines, since actual failure situations are unique.

##### A.3 Flooding or Overtopping

- A dam breach is occurring and flows are rapidly increasing.
- The reservoir level is at crest of the dam and rising rapidly.
- Water is flowing over dam crest, onto and eroding the embankment.
- The spillway has failed and flood flows are rapidly eroding embankment materials.
- Head cutting in spillway and embankment is occurring.

### B.3 Embankment or Reservoir Rim Movement

- A deep landslide moves part of the embankment and extends into upstream slope of dam to the water level.
- Rapidly increasing and muddy leakage is observed through cracks that extend below water level.
- There is any embankment or reservoir slope movement that results in continuous water flow over the crest of dam.

### C.3 Leakage or Internal Erosion

- Internal piping erosion in dam is observed, is still occurring, and flow exceeds 2 cfs.
- A sinkhole or pipe has caused drop in portion of dam crest.
- There is internal erosion causing crest drop and water to flow over crest of dam.



### Step 3      Notifications and Communication

#### Notification

After the emergency level has been determined, people on the following notification flowcharts (pages 14-16) for the appropriate emergency level shall be notified immediately.

#### Communication:

There is cell phone service at and in the vicinity of the Dam.

#### 5.31    Non-emergency incident; unusual event; slowly developing situation

The Dam Owner should contact State Dam Safety Engineer and the Dam Owner's Engineer (see page 14), describe the situation, and request technical assistance on the next steps that should be taken.

#### 5.32    Potential dam failure situation; rapidly developing

The Dam Owner should contact Local Emergency Manager, State Dam Safety Engineer, and the Dam Owner's Engineer (see page 15), describe the situation, and request technical assistance on the next steps that should be taken. The following message may be used to help describe the emergency situation to the Local Emergency Manager:

#### Message

"I am reporting an emergency at Barnes Butte Reservoir. This is [name and position] with [organization]. At this time this emergency represents a potential dam failure with a rapidly developing situation. Please inform Crook County Emergency Management and make other emergency contacts as necessary to prepare for possible evacuations. I am at [location] and can be reached at [phone number]. We are taking emergency actions to save the dam, and will contact the State dam safety engineer and our engineer for technical advice on preventing a full on dam failure."

The Local Emergency Manager should contact local residents and others in the area that may be potentially affected by a failure. These people are to use this information at their discretion.

#### 5.33    Urgent; dam failure is imminent or in progress

The Local Emergency Manager must be contacted immediately (see page 16) and the potentially flooded area must be evacuated (see Section 9: Inundation Maps). The following actions should be taken:

- 1) Call 911 and be sure to say, "***This is an emergency***". The following message may be used to help describe the emergency situation to the Local Emergency Manager:

#### Message

"I am reporting an emergency at Barnes Butte Reservoir. This is [name and position] with [organization]. The dam is failing and a dam breach flood will occur. People are in danger and need to evacuate. Please inform Crook County Emergency Management and make other emergency contacts as necessary to start evacuation immediately. Please implement the emergency action plan. I am at [location] and can be reached at [phone number] after I have made emergency notifications."

- 2) Keep in frequent contact with the Local Emergency Manager to keep them up-to-date on the condition of the dam. They will tell you how you can help handle the emergency.
- 3) If all means of communication are lost: (1) try to find out why, (2) try to get to another radio or telephone that works, or (3) get someone else to try to reestablish communications. If these means fail, handle the immediate problems as well as you can, and periodically try to reestablish contact with the Local Emergency Manager and emergency services.

The following pre-scripted message may be used as a guide for the Local Emergency Manager to communicate the status of the emergency with the public:

Attention: This is an emergency message from (the Local Emergency Manager). Listen carefully. Your life may depend on immediate action.

**Barnes Butte Reservoir is failing. Repeat. Barnes Butte Reservoir is failing. If you are in or near this area, proceed immediately to high ground away from the valley. Do not travel on NE Main Street, NW 9<sup>th</sup> Ave or along Ochoco Creek. Remain at a distance above these low elevations and wait for flood levels to recede.**

Repeat message

## Unusual Conditions Notifications

### Dam Owner made aware of Unusual Condition

#### Dam Owner

Hudspeth Family LTD Partnership  
Anne Jackson  
(970) 259-3080

### Dam Owner to make the following contacts

#### Oregon Water Resources Department

##### Primary

Keith Mills, State Dam Safety Engineer  
Office: (503) 986-0840  
Cell: (541) 706-0849

##### Alternate #1

Jeremy Giffin, District 11 Watermaster  
Office: (541) 306-6885  
Cell: (541) 410-9103

#### Technical Consultant

Ochoco Irrigation District  
General Manager  
(541) 447-6449

## Potential Failure Notifications

### Incident is observed

### Call 9-1-1

### Crook County 9-1-1 Call Center to make the follow Notifications:

#### Crook County Emergency Services

##### Primary

Emergency Manager, Mike Ryan  
Office: (541) 416-3969  
Cell: (541) 921-7448

##### Alternate

County Sherriff, Jim Hensley  
Office: (541) 447-6398  
Cell: (541) 419-5136

#### Ochoco Irrigation District

General Manager, Mike Kasberger  
(541) 447-6449

#### Oregon Water Resources Department

##### Primary

Keith Mills, State Dam Safety Engineer  
Office: (503) 986-0840  
Cell: (541) 706-0849

##### Alternate #1

Jeremy Giffin, District 11 Watermaster  
Office: (541) 306-6885  
Cell: (541) 410-9103

#### Dam Owner Representatives

Brian Barney  
Home: (541) 447-1399

## **Urgent Failure Notifications**

**Anyone observing rapid dam failure**

**Call 9-1-1**

**Crook County 9-1-1 Call Center to make the follow Notifications:**

**Notify Patrol to start evacuations**

**Crook County Emergency Services**

Primary

Emergency Manager, Mike Ryan

Office: (541) 416-3969

Cell: (541) 921-7448

Alternate

County Sherriff, Jim Hensley

Office: (541) 447-6398

Cell: (541) 419-5136

**Chief of Police**

Interim Chief Les Stiles

541-447-8330

**Crook County Fire**

Matt Smith

Phone: (541) 447-5011

Cell: (541) 633-9563

**Dam Owner Representatives**

Brian Barney

Home: (541) 447-1399

**Ochoco Irrigation District**

General Manager, Mike Kasberger

(541) 447-6449

**Oregon Emergency Response Center (OERS)**

(800) 452-0311

**Oregon Water Resources Department**

Primary

Keith Mills, State Dam Safety Engineer

Office: (503) 986-0840

Cell: (541) 706-0849

Alternate #1

Jeremy Giffin, District 11 Watermaster

Office: (541) 306-6885

Cell: (541) 410-9103



## **Step 4 Expected Actions**

If the Local Emergency Manager receives a 911 call regarding observations of an unusual or emergency event at the dam, they should immediately contact the Dam Owner. After the Dam Owner determines the emergency level, the State Dam Safety Engineer should be contacted for technical consultation and the following actions should be taken depending on the situation.

### **5.41 Non-emergency incident; unusual event; slowly developing situation**

- A. The Dam Owner should inspect the dam and report finding to state dam safety engineer. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also check the reservoir area, abutments, and downstream channel for signs of changing conditions. If increased seepage, erosion, or settlement is observed, immediately report the observed conditions to the State Dam Safety Engineer; refer to the emergency level table for guidance in determining the appropriate event level for the new condition and recommended actions.
- B. The Dam Owner should contact the State Dam Safety Engineer and Dam Owner's Engineer and request technical staff to investigate the situation and recommend corrective actions.

### **5.42 Potential dam failure situation; rapidly developing**

- A. The Dam Owner should contact the Local Emergency Manager to inform him/her that the EAP has been activated and, if current conditions get worse, the emergency level may increase and the emergency situation may require evacuation. Preparations should be made for possible road closures and evacuations.
- B. The Dam Owner should report the situation to the State Dam Safety Engineer and Ochoco Irrigation District and request investigation of the situation and recommend corrective actions.
- C. If time permits, the Dam Owner should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also check the reservoir area, abutments, and downstream channel for signs of changing conditions. If piping, increased seepage, erosion, cracking, or settlement are observed, immediately report the observed conditions to the Local Emergency Manager and State Dam Safety Engineer. Refer to the emergency level table for guidance in determining the appropriate event level for the new condition and recommended actions.
- D. Record all contacts that were made and all information, observations, and actions taken. Note the time of changing conditions.
- E. If time permits, the following emergency remedial actions should be considered for Emergency Level 2 conditions. Immediate implementation of these remedial actions may delay, moderate, or prevent the failure of the dam. Several of the listed adverse or unusual conditions may be apparent at the dam at the same time, requiring implementation of several modes of remedial action. Close monitoring of the dam must be maintained to confirm the success of any remedial action taken at the dam. Time permitting, any remedial action should be developed through consultation with the State Dam Safety Engineer. See Appendix B for sources of equipment and materials to assist with remedial actions.

*Embankment movement*

- 1) Open outlet(s) and lower the reservoir to a safe level at a rate commensurate with the urgency and severity of the condition of the slide or slump. If the outlet is damaged, blocked, or of limited capacity, pumping or siphoning may be required.
- 2) Repair settlement of the crest by placing sandbags or earth and rock fill materials in the damaged area to restore freeboard.
- 3) Stabilize slides on the downstream slope by placing a soil or rock fill buttress against the toe area of the slide.

#### *Embankment overtopping*

- 1) Place sandbags along the low areas of the top of the dam to reduce the likelihood of overtopping and to safely direct more water through the spillway.
- 2) Cover the weak areas of the top of the dam and downstream slope with riprap, sandbags, plastic sheets, or other materials to provide erosion-resistant protection.

#### *Seepage and sinkholes*

- 1) Open outlet(s) to lower the reservoir level as rapidly as possible to a level that stops or decreases the seepage to a non-erosive velocity. If the outlet is damaged, blocked, or of limited capacity, pumping or siphoning may be required. Continue lowering the water level until the seepage stops.
- 2) If the entrance to the seepage origination point is observed in the reservoir (possible whirlpool) and is accessible, attempt to reduce the flow by plugging the entrance with readily available materials, such as hay bales, bentonite, soil or rock fill, or plastic sheeting.
- 3) Cover the seepage exit area(s) with several feet of sand/gravel to hold fine-grained embankment or foundation materials in place. Alternatively, construct sandbag or other types of ring dikes around seepage exit areas to retain a pool of water, providing backpressure and reducing the erosive nature of the seepage.
- 4) Prevent vehicles and equipment from driving between the seepage exit points and the embankment to avoid potential loss from the collapse of an underground void.

#### *Earthquake*

- 1) Immediately conduct a general overall visual inspection of the dam.
- 2) Perform field survey to determine if there has been any settlement and movement of the dam embankment, spillway and low level outlet works.
- 3) Drain reservoir if required.

#### **5.43 Urgent; dam failure is imminent or in progress**

- A. The Dam Owner shall immediately contact the Local Emergency Manager and others shown on the notification flow chart.
- B. The Local Emergency Manager shall lead the efforts to carry out warnings, close roads, and evacuate people at risk downstream from the dam (see Appendix A).
- C. The Local Emergency Manager shall alert the general public and immediately evacuate at-risk people and close roads as necessary.
- D. The Dam Owner shall maintain continuous communication and provide the Local Emergency Manager with updates of the situation to assist him in making timely decisions concerning warnings and evacuations.
- E. The Dam Owner should record all contacts that were made and all information, observations, and actions taken. Note the time of changing conditions. Document the situation with photographs and video, if possible.
- F. Advise people monitoring the dam to follow safe procedures. Everyone should stay away from any of the failing structures or slopes and out of the potential breach inundation areas.

#### **Step 5 Termination**

Whenever the EAP has been activated and a dam failure emergency declared, the Incident Commander will determine when the emergency is over based on actual conditions. The Incident Commander will relay this decision to the dam owner and other Emergency Responders. The 9-1-1 dispatcher shall contact OERS to inform them the emergency has been terminated.

Prior to termination of a dam failure event that has not caused actual dam failure, the State Dam Safety Engineer will inspect the dam or require the inspection of the dam to determine whether any damage has occurred that could potentially result in loss of life, injury, or property damage. If it is determined conditions do not pose a threat to people or property, the Incident Commander will be advised to terminate EAP operations as described above.

Prior to Termination of a potential failure emergency, the State Dam Safety Engineer should be consulted. A non failure condition may be terminated when conditions return to normal, or after an engineer determines that the unusual conditions pose no dam safety risk.



## 6.0 Maintenance: EAP Review and Revision

Emergency Action Plans should be considered “Living Documents”. This means that: (1) They will never be complete, (2) They should be reviewed not less than annually, (3) Reviews should include participation of the local emergency manager, (4) All updates should be made promptly. Additionally, emergency incidents at dams and/or dam failures are not common events. Therefore, training and exercises are necessary to maintain emergency response readiness, timeliness, and effectiveness. The EAP therefore requires periodic maintenance to remain current and as useful and effective as possible. The three steps in Maintenance include:

### 6.1 Review

The EAP minimum annual review should include the following:

- Calling all contacts on the three notification charts in the EAP to verify that the phone numbers and persons in the specified positions are current.
- Contacting all record holders of the EAP to verify where the EAP is kept and if responsibilities as described in the EAP are understood.
- Calling the locally available resources to verify that the phone numbers, addresses, and services are current.
- Review people and structures at risk information for changes in development within the dam failure flood inundation area downstream of the dam.

### 6.2 Revision

The EAP will be revised if any of the contacts, responsibilities, services or service providers, or people at risk information has changed. The Dam Owner is responsible for updating the EAP documents. The EAP document held by the Dam Owner is the master document. When revisions occur, the Dam Owner should provide the revised pages and a revised Revision Summary Page to all the EAP document holders. The document holders are responsible for revising outdated copy of the respective document(s) whenever revisions are received. Outdated pages shall be immediately discarded to avoid any confusion with the revisions.



## 7.0 Record of Holders of Control Copies

Copy Number	Organization	Person receiving Copy
1	Hudspeth Family LTD Partnership	Brian Barney
2	Oregon Water Resources Department 725 Summer Street NE, Suite A Salem, OR 97301	Keith Mills
3	Crook County Emergency Management	Michael Ryan
4	Ochoco Irrigation District	Mike Kasberger
5	Crook County Fire	Matt Smith
6	Prineville Police Department	Les Stiles
7	Crook County 9-1-1	Tobie Reynolds

## 8.0 Record of Revisions and Updates

[illegible]

## 9.0 Concurrences

1. Steve Jackson HFLP 10.27.14  
Signature Organization Date

Printed Name and Title: Owner

2. Keith Mills  10-15-14  
Signature Organization Date

Printed Name and Title: Keith Mills, Oregon State Dam Safety Engineer

3. [Signature]  10/15/14  
Signature Organization Date

Printed Name and Title: Michael Ryan, Emergency Manager

## 10.0 Inundation Maps and Evacuation plans

The following floodplain map was generated from a dam breach and 500-year flooding event combination. These results are the most catastrophic and therefore the most conservative. If you remain outside these boundaries during a dam breach you are not considered “at risk”.







## Appendix A: Available Local Resources

Heavy equipment service and rental					
Name:	Prineville equipment and Supply	Name:	Craig Woodward Woodward Companies	Name:	Scott Porfily SMAF Construction
Address:	1883 NW Gardner Rd. Prineville, OR (541) 447-8145	Address:	Prineville OR 541-447-3841	Address:	Prineville OR 541-447-5643
Sand and gravel supply					
Name:	Rock Products Manufacturing Inc	Name:	Brad Bartlett Bartlett Excavating	Name:	Todd Taylor Taylor Northwest
Address:	4411 NW Elliott Ln Prineville, OR (541) 447-8600	Address:	Prineville OR 541-447-3301	Address:	Bend OR 541-382-7887
Ready-mix concrete supply					
Name:	Concrete Mobile Mix	Name:		Name:	
Address:	Prineville OR (541) 447-1378	Address:		Address:	
Pumps					
Name:	6 Rue Marche	Name:		Name:	
Address:	525 SW 6 <sup>th</sup> St. Redmond, OR (541) 923-7242	Address:		Address:	
Diving Contractor					
Name:	Fred Devine Diving and Salvage	Name:		Name:	
Address:	6211 North Ensign Portland, OR 97217 (503) 283-5285	Address:		Address:	

## Appendix B: Dam Data

<b>Dam Name</b>	Barnes Butte Reservoir
<b>River</b>	Tributary to the Ochoco Creek
<b>State</b>	OR
<b>County</b>	Crook
<b>NID Height (Ft.)</b>	28 ft
<b>Dam Length (Ft.)</b>	400 ft
<b>Owner_Name</b>	Hudspeth Family LTD Partnership
<b>Private_Dam</b>	Yes
<b>NID Storage</b>	380 ac-ft
<b>Max Discharge</b>	NA
<b>Max Storage</b>	420 ac-ft
<b>Drainage_Area</b>	4.40 sq. miles
<b>Longitude</b>	44.3267
<b>Latitude</b>	-120.826118
<b>Dam_Designer</b>	Fred Gustafson
<b>Core</b>	Select Clayey material
<b>Foundation</b>	Clay
<b>EAP</b>	YES
<b>Inspection_Date</b>	08/23/2013
<b>Spillway_Type</b>	Trapezoidal Channel
<b>Spillway_Width</b>	15 ft
<b>NIDID</b>	OR00284
<b>Owner Type</b>	Private
<b>Dam Type</b>	Earthen
<b>Primary Purpose</b>	Irrigation
<b>All Purposes</b>	Irrigation
<b>Other Dam Name</b>	NONE
<b>Inspection Frequency</b>	Annually
<b>Dam Height (Ft.)</b>	28
<b>Structural Height (Ft.)</b>	28

<b>State Reg Dam</b>	Y
<b>State Reg Agency</b>	Oregon WRD
<b>Year Completed</b>	1956
<b>StateID</b>	
<b>Section</b>	
<b>Year Modified</b>	
<b>Outlet Gates</b>	NONE
<b>Volume</b>	0
<b>Number Of Locks</b>	0
<b>Length Of Locks</b>	0
<b>Width Of Locks</b>	0
<b>Fed Funding</b>	NONE
<b>Fed Design</b>	NONE
<b>Fed Construction</b>	NONE
<b>Fed Regulatory</b>	NONE
<b>Fed Inspection</b>	NONE
<b>Fed Operation</b>	NONE
<b>Fed Owner</b>	NONE
<b>Fed Other</b>	NONE
<b>Source Agency</b>	OR
<b>Submit Date</b>	
<b>Congressional District</b>	
<b>Political Party</b>	
<b>Normal Storage</b>	386 ac-ft
<b>Congressional Rep.</b>	
<b>Other Structure Id</b>	B-38 (OWRD)
<b>Url Address</b>	NA
<b>Number Of Separate Structures</b>	0
<b>Permitting Authority</b>	Y
<b>Inspection Authority</b>	Y

## Appendix C: Glossary of Terms

<b>Abutment</b>	The natural valley or canyon side against which the dam is built.
<b>Acre-foot</b>	A unit of volumetric measure that would cover one acre to a depth of one foot. One acre-foot is equal to 43,560 cubic feet or 325,850 gallons.
<b>Appurtenant Structures</b>	Ancillary features of a dam such as outlets, spillways, powerplants, tunnels, etc.
<b>Boil</b>	A disruption of the soil surface due to water discharging from below the surface. Eroded soil may be deposited in the form of a ring (miniature volcano) around the disruption.
<b>Breach</b>	An opening through a dam that allows the uncontrolled draining of a reservoir. A controlled breach is a constructed opening. An uncontrolled breach is an unintentional opening caused by discharge from the reservoir. A breach is generally associated with the partial or total failure of the dam.
<b>Conduit</b>	A closed conveyance used to release water through a dam
<b>Control section</b>	A usually level segment in the profile of an open channel spillway above which water in the reservoir discharges through the spillway.
<b>Dam</b>	A hydraulic structure built above the natural ground grade line that is used to impound water. Dams include wastewater lagoons and other hydraulic structures that store water attenuate floods, and divert water into canals.
<b>Dam failure</b>	The uncontrolled release of a dam's impounded water.
<b>Dam Owner</b>	Any person, private or non-profit company, special district, federal, state, or local government agency, or any other entity in direct routine control of a dam and reservoir, and/or directly involved in the physical operation and maintenance of a dam, or proposes to construct a dam.
<b>Drainage area (watershed)</b>	The land that will drain to the dam.
<b>Emergency Action Plan (EAP)</b>	A plan that assists the dam owner or operator and local emergency manager perform actions that ensure the safety of people in the event of a potential or actual dam failure or in the event of a sudden release of water.
<b>Engineer</b>	A Professional Engineer registered and licensed by the State of Oregon. The Engineer must be sufficiently qualified and experienced in the design, construction, and safety evaluation of the type of dam under consideration.
<b>Freeboard</b>	The vertical dimension between the crest (or invert) of the emergency spillway and the crest of the dam.
<b>Hazard Classification</b>	The rating established by the department of the potential damage to life and property downstream of a dam in the event of a dam failure.
<b>Head Cutting</b>	Erosion moving upstream toward the dam embankment caused by high velocity flows.
<b>Inundation Map</b>	A map depicting the area downstream from a dam that would reasonably be



	expected to flood in the event of a failure of the dam.
<b>Local Emergency Manager</b>	Person(s) responsible for developing, organizing and exercising a community's emergency operations plan. Typically City Police or Fire Department or County Sheriff's Department personnel act as the Local Emergency Manager.
<b>Notification</b>	To immediately inform appropriate individuals, organizations, or agencies about a potentially emergency situation so they can initiate appropriate actions.
<b>Outlet</b>	A conduit (usually regulated by gates or valves) used for controlled or regulated releases of impounded water from the reservoir.
<b>Piping</b>	The progressive destruction of an embankment or embankment foundation by internal erosion of the soil by seepage flows.
<b>Reservoir</b>	A body of water impounded by a dam.
<b>Seepage</b>	The dispersed flow of water through the embankment, foundation, or abutments of the dam exiting on the ground surface or a toe drain.
<b>Slide</b>	Movement of a mass of earth down slope at a rate that can cause damage.
<b>Spillway</b>	The structure designed to bypass flood water and prevent water overtopping the dam crest. Dams may have two or more spillways.
<b>State Engineer</b>	A registered professional engineer working for the department, and may be either the director or a principal assistant working for the director as described in ORS 536.032..
<b>Toe of dam</b>	The junction of the upstream or downstream face of an embankment with the ground surface.
<b>Top of dam (crest of dam)</b>	The elevation of the uppermost surface of an embankment which can safely impound water behind the dam.